

Appendix C
Methods for Scenic Evaluation

A. Evaluation Process for Scenic Resources and Values

The analysis of the existing scenery and scenic values of this section of the Lower Riverway is being conducted in direct response to a proposal to construct an Interstate grade highway bridge across the lower St. Croix between Oak Park Heights, Minnesota and Houlton, Wisconsin. Included in this analysis is a visual contrast rating that compares the scenic impacts of the proposed bridge with existing conditions. This analysis has been prepared to support the requirements of the Section 7(a) evaluation for the proposed river crossing project.

This analysis does not attempt to evaluate the aesthetic qualities of the bridge design or the structure itself. Rather, it evaluates the impact of introducing a new structure, as designed and proposed, to this environment and quantifies scenic impacts. The NPS has adopted and adapted the Visual Resource Management (VRM) System developed by the Bureau of Land Management (BLM) to evaluate scenic impacts on the Lower Riverway. Descriptions of landscape character, inventory classes and the visual contrast rating of the proposed bridge are the portions of the VRM system that have been used in this analysis. Impact reduction efforts are being addressed outside of the VRM system. The primary advantage of using the VRM System in this evaluation is that it takes what might ordinarily be considered a subjective evaluation and places it within relatively objective parameters. An additional benefit of the VRM system is that it utilizes an interdisciplinary process.

From Bureau of Land Management Manual 8400 –Visual Resource Management:

“Use of Basic Landscape Design Principles. Assigning values to visual resources is a subjective process. The phrase, ‘beauty is in the eye of the beholder’, is often quoted to emphasize the subjectivity in determining scenic values. Yet, researchers have found consistent levels of agreement among individuals asked to evaluate visual quality. Designers have used the basic design elements of form, line, color and texture to evaluate landscapes for hundreds of years. Modifications in a landscape which repeat the landscape’s basic elements are said to be in harmony with their surroundings. Modifications which do not harmonize often look out of place and are said to contrast or stand out in unpleasing ways. These basic design elements and concepts have been incorporated into the VRM system to lend objectivity, integrity, and consistency to the process. The VRM system is designed to separate the existing landscape and the proposed project into their features and elements and to compare each part against the other in order to identify those parts which are not in harmony.”

B. Land Management Area and Visual Resource Classification

The new bridge would be located in a land management area designated by the CMP as “river town” on the Minnesota side and “rural residential” on the Wisconsin side. On the Minnesota side, a land management area designated as “small town” is located just to the south (downstream). The CMP states that cultural elements rather than natural elements will dominate the scene in the River Town Management Area and to a limited degree in the Small Town Management Area. The overall character of the municipalities is not to significantly change as a

result of new development. The following descriptions outline general and specific Land Management Area Objectives for the Lower Riverway:

1. Land Management Areas General Guidance from 2002 CMP:

“The land management area allocation is intended to maintain long stretches of the river in a natural condition, while still allowing development in municipalities.”

“Limited new development may occur within existing municipalities along the riverway. In the river town management area, development will be guided by the community’s underlying plans and ordinances. In the river town and small town historic management areas, new development will be allowed providing it is consistent with the historic character of the communities. New development also may be in the small town management areas, provided the existing large-lot, single-family character of the areas does not change. There are few industrial uses within the riverway; if an industrial site is ever abandoned, the most desirable future use of the riverfront portions of those properties will be public park.

The emphasis will be to ensure the overall character of the municipalities do not significantly change. Some state land use regulations will be relaxed in the river town, small town historic, and small town management areas to give local governments greater flexibility over land use.

Although there will be more flexibility than there is today in managing developments in municipalities, new developments and their effects will continue to be monitored within municipalities. To ensure that the character of the communities does not significantly change, and to help minimize impacts on adjacent rural areas, the riverway managing agencies will encourage local governments to cluster new development in the riverway towns. Local governments also will be encouraged to protect historic values in the river town and small town historic management areas through several methods. Examples of these methods will be adaptive reuse of existing historic structures, adoption and enforcement of historic preservation ordinances, and adoption of architectural standards that require new development to be consistent with the historic community character.

Limited new developments may still be allowed in rural residential management areas, so long as they complied with land use regulations.”

2. Land Management Areas within this section of the river from 2002 CMP:

a) River Town Management Area

“This management area would provide a feeling of being on a river flowing through or next to a small city. A mixture of commercial, park, and residential developments will be within the riverway; however, the historic character of the river towns will be maintained. Dense, intensive development also may be adjacent to the riverway, including utilities, multistory structures, and nonresidential buildings (e.g., shops, offices, apartments, factories, community centers). Thus, the built environment will dominate the riverine landscape and shape the riverway experience to a significant degree.

Although most of the developments in the area will not be recreation-oriented, there will be private or public facilities to support river recreation (e.g., marinas, docks, launches, ramps, interpretive kiosks); some of these facilities will be relatively large. Large numbers of people and crowds often will be present. Noise levels from users and adjacent areas (e.g., business traffic) may be high. One will not expect to see many natural features other than the river. Most of the shoreline will be developed, although some natural vegetation may screen adjacent buildings. However, these natural features will be scattered and limited in area. There will be relatively few opportunities to view wildlife, but people will still find places to fish from shore.”

b) Small Town Management Area

“This management area is similar to the small town historic management area, except the predominant character of the landscape will be large-lot, single-family residences. Encounters with other people will be common, and noise levels may be moderate. Natural vegetation and landscaped environments will be interspersed with the built environment, which will be mostly residential in character. Shoreline areas generally will be a mix of natural vegetation and residential lawns, with some portions being largely undisturbed. Public and private recreational support structures, primarily small docks and boat ramps, will be scattered along the river.”

c) Rural Residential Management Area

“This management area provides a feeling of being on a river in a sparsely developed landscape. As in the small town management areas, the river, natural features, and man-made features will shape the riverway experience. Users will encounter no large concentrations of development or people — small numbers of people will be the rule in this area, with little or no commercial development. Residential settings will be limited to large lot development scattered along the shore and/or bluffs at a lower density than the small town or river town management areas. Natural vegetation will cover significant portions of the

shoreline, with some stretches being largely undisturbed. Riverway users may anticipate moderate noise levels. The area will offer abundant opportunities to fish and view wildlife. There may be a few small public recreational support facilities (e.g., docks and launches) and some private docks.”

3. Integrating Cooperative Management Plan and Visual Resource Class Objectives

Addressing the established 2002 CMP management objectives is the first consideration when approaching any proposed action that may affect the scenic resources of the Lower Riverway. Applying the BLM Visual Resources Management System to the lower St. Croix provides additional evaluative criteria for which to compare, relate and integrate visual resources with existing Management Area Objectives. The BLM VRM system uses an inventory process to provide a means for determining relative visual values of the landscape. Visual Resource Inventory Classes are assigned through the inventory process. The inventory process consists of three separate evaluations of scenic quality, visual sensitivity, and distance zones or “seen” areas within a given area. These three separate evaluations are overlaid and the various combinations compared to assign a range of visual resource inventory classes. Inventory classes are informational in nature and when considered with other land use management objectives, inform the ultimate determination of Visual Resource Management Classes.

The BLM VRM system provides guidance for developing interim visual resource classes when a land management plan exists but has not incorporated VRM objectives. Given the fact that the NPS has adopted the Bureau of Land Management VRM system for use on the Lower Riverway in direct response to the proposed bridge, the interim guidelines have also been adopted. With management objectives already in place for the scenic resources of the Lower Riverway, the BLM visual resource classes have been applied as an additional overlay.

The BLM Visual Resource Class definitions have been adapted to include cultural elements along with natural features to best meet CMP management objectives. Cultural resource modifications are accommodated to effectively blend CMP Management Area Objectives with the Visual Resource Class Objectives. All proposed actions and management activities repeat the basic elements of form, line, color and texture regardless of resource type. The following descriptions outline the four BLM Visual Resource Class Objectives, as adapted, for comparison and integration into the CMP Land Management Area Objectives. For the purposes of this evaluation, “management activity” and “management activities” are considered to be actions either taken or proposed regardless of the entity taking or proposing the action. Cultural resource adaptations are identified in [brackets].

4. Visual Resource Class Objectives

The **VRM Class I Objective** is “to preserve the existing character of the landscape. This class provides for natural and ecological changes; however it does not preclude very limited management activity. The level of change to the characteristic landscape should be low and must not attract attention.”

The **VRM Class II Objective** is “to retain the existing character of the landscape. The level of

change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color and texture found in the predominant natural [and cultural] features of the characteristic landscape.”

The **VRM Class III Objective** is “to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities [in the form of changes to the existing character of adjacent communities] may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural [and cultural] features of the characteristic landscape.”

The **VRM Class IV Objective** is “to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. The management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating basic elements.”

5. Visual and Scenery Inventory

Following the VRM system, a scenic quality evaluation, a sensitivity level analysis and a distance zone/“seen area” evaluation were conducted within the area between the Boom Site in north Stillwater and North Hudson.

a) Scenic Quality Evaluation

“Scenic Quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, public lands are given an A, B, or C rating [with ‘A’ being the highest rank and ‘C’ the lowest] based on apparent scenic quality which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. During the rating process, each of these factors are ranked on a comparative basis with similar features within the physiographic province. ...An important premise of the evaluation is that all public [or publically administered] lands have scenic value, but areas with the most variety and most harmonious composition have the greatest scenic value. Another important concept is that the evaluation of scenic quality is done in relationship to the natural landscape. This does not mean that man-made features within a landscape necessarily detract from the scenic value. Man-made features that compliment the natural landscape may enhance the scenic value. Evaluations should avoid any bias against man-made modification to [the] natural landscape.” (BLM Manual H-8410-1 –Visual Resource Inventory)

Despite the considerable discordant and disharmonious development on the Minnesota side of the river, especially due to the coal-fired power plant, which detracts considerably from the scenic quality, an overall rating of “A” was determined.

Factors that ranked highest in this rating included water, color and the influence of adjacent scenery. The clear and clean appearing, expansive, still water of Lake St. Croix dominates the landscape within this valley. The variety and seasonal effects of the vegetation as well as the contrast between water and vegetation and the reflective quality of the water surface that mirrors the ever changing sky all create rich color combinations. The influence of the adjacent scenery of the relatively unspoiled Wisconsin bluffs greatly enhances the visual quality of this immediate area.

Factors that also rated high, although to a lesser degree than water, color and adjacent scenery were landform, vegetation and scarcity. The relatively high vertical relief of the bluff walls with the associated steep slopes dominates the landscape in this area. The relatively unique nature of this river and river valley especially considering the size and scale make this a somewhat scarce resource within the immediate region. Only the Mississippi River further downstream from the mouth of the St. Croix River parallels this setting. The relatively steep slope of the bluffs provides an outstanding angle from which to view the forested hillside and the associated textural forms. Several vegetation community types exist from floodplain and water's edge to the top of the bluffs.

Most cultural modifications within the historic community of Stillwater are arranged in a visually copasetic manner, contribute favorably to the visual variety of the landscape and are generally at a size and scale that does not oppose the natural landscape. Cultural modifications on the Wisconsin side of the river are few, relatively small in size and scale, generally use muted, natural colors and are situated so as to recede into the dominant forest. Other modifications on the Minnesota side, such as the bold striped marina awnings, multiple buildings with contrasting colors and the giant power plant all introduce highly discordant elements into the landscape and therefore detract strongly from the overall scenic quality.

Taking all factors into consideration, including the low rating of the cultural modification factor, the overall rating is high. The scenic quality rating for this area of the lower St. Croix is not surprising given the fact that it was established as a National Scenic Riverway despite the high level of cultural modifications that existed at the time of designation.

b) Sensitivity Level Analysis

"Sensitivity Levels are a measure of public concern for the scenic quality of a particular area. Public lands are assigned high, medium or low sensitivity levels by analyzing the various indicators of public concern."
(BLM Manual H-8410-1 –Visual Resource Inventory)

Factors to consider when measuring public concern for the scenic quality include the type of users, the amount of use, public interest, adjacent land uses, and special areas. The St. Croix National Scenic Riverway management team performed a sensitivity level rating based on the general nature of use and visitation along this section of the River. Each

factor was individually rated and then an overall rating was assigned based on the total compilation of ratings and the relationship between individual factors. The overall sensitivity level rating was determined to be “moderate” for most users within this section.

For the type of user, the maintenance of visual quality within this area of the lower St. Croix was determined to be a moderate to major concern for most users. In terms of the amount of use, the maintenance of visual quality becomes more important as the level of use increases. This section of the river is extremely popular for motorized boating and fishing enthusiasts. The amount of use in this area is very high, exceeding 10,000 visits per year at adjacent recreation sites and parks, exceeding 20,000 visits per year on the river and exceeding 45,000 visits per year on adjacent roads and highways that provide views of the river. In terms of overall public interest, it was determined that the maintenance of visual quality is a minor to moderate public issue. The maintenance of visual quality to sustain adjacent land use objectives was determined to be moderately important. This determination was made due to the fact that while the Wisconsin side of the river generally remains in a natural and pastoral condition, the Minnesota side of the river is much more developed, a portion of which is within an historic district whose scenic values are important to uphold. Because the lower St. Croix is a designated as a component of the National Wild and Scenic Rivers System, it was determined that the maintenance of visual quality to sustain the special area management objectives is very important. Given these factors, the overall sensitivity level rating was moderate.

c) Distance Zones

“Landscapes are subdivided into 3 distance zones based on relative visibility from travel routes or observation points. The 3 zones are: foreground-middle ground, background, seldom seen. The foreground-middle ground zone includes areas seen from highways, rivers, or other viewing locations which are less than 3-5 miles away. Seen areas beyond the foreground-middle ground zone, but usually less than 15 miles away, are in the background zone. Areas not seen as foreground-middle ground or background (i.e., hidden from view) are in the seldom seen zone.”
(BLM Manual H-8410-1 –Visual Resource Inventory)

A distance zone/seen zone analysis was performed using Geographic Information System (GIS) analysis combined with field observations from multiple observation points on land along the river and from the river while by boat in this section. Given the relatively open and broad expanse of surface water in this area, most locations within the bluff line limit could be seen from at least one observation point. The location on the Wisconsin bluff where the bridge connects to the abutment would be seen from most viewpoints within and along the river. A GIS reverse spread analysis from the proposed bridge location renders an approximation of the locations from which the bridge structure could be seen. Using the 5 mile limit, and considering the bluff line created by the valley landform with the strong axial views up and down river, most locations within this area have been designated foreground-middle ground zone (see Appendix A, Figure 14).

6. Visual Resource Class Determinations

Based on the combined overlays of the scenic quality evaluation, the sensitivity level analysis and the distance zone/seen area evaluation a Visual Resource Inventory Class II was determined for this specific river segment. However, because the lower St. Croix was designated by Congress as a component of the System, Visual Inventory Class I may apply. A detailed description for each class is described in the previous section on Visual Resource Class Objectives (Section V, C, 4).

Given the fact that these inventory classes are recommendations and were not developed as part of the CMP process, it is important to consider the Land Management Area designations, the desired conditions within those areas and the land management area objectives. Several land management area objectives for the River Town Management Area that should be considered when assigning Visual Resource Class Objectives include: “new development will be allowed providing it is consistent with the historic character of the communities”, “the emphasis will be to ensure the overall character of the municipalities do not significantly change”, and “the historic character of the river towns will be maintained”. Visual Resource Class II best meets these objectives and matches the identified inventory classification and will, therefore, be applied to the River Town Management Area on the Minnesota side of the river.

Several land management area objectives for the Rural Residential Management Areas that should be considered when assigning Visual Resource Class Objectives include: “this management area provides a feeling of being on a river in a sparsely developed landscape”, “residential settings will be limited to large lot development scattered along the shore and/or bluffs at a lower density than the small town or river town management areas” and “natural vegetation will cover significant portions of the shoreline, with some stretches being largely undisturbed.” Visual Resource Class II also best meets these objectives and matches the identified inventory classification and will therefore be applied to the Rural Residential Management Area on the Wisconsin side of the river.

Several land management area objectives for the Small Town Management Area that should be considered when assigning Visual Resource Class Objectives include: “natural vegetation and landscaped environments will be interspersed with the built environment, which will be mostly residential in character” and “shoreline areas generally will be a mix of natural vegetation and residential lawns, with some portions being largely undisturbed.” Visual Resource Class II best meets these objectives and matches the identified inventory classification and will, therefore, be applied to the Small Town Management Areas on the Wisconsin side of the river.

Visual Inventory Class I has been applied to the river itself. This determination is based on the free-flowing, publicly accessible and navigable surface water conditions. The determination also considers the Congressional designation of the Lower Riverway as a component of the National Wild and Scenic Rivers System. The Class I determination is further upheld due to the existing outstanding, remarkable, and relatively unobstructed views up and down stream.

C. Visual Assessment of Proposed New Bridge

1. Description of the Proposed Bridge

As described in Section II above, the proposed bridge would be an extradosed girder structure spanning the Lower Riverway between Minnesota and Wisconsin. The bridge would be just short of one mile in length of which all of the structure would be within the Riverway boundary. Approximately 3/5 of the structure would be directly over the river. Because this proposed bridge type is relatively new, having only been in existence for the past twenty years with only 40 of its type in existence worldwide, considerable structural engineering and design remains to occur. As a result, the design has undergone several substantial modifications since first proposed and will likely still change before the design is considered final. As such, for purposes of this evaluation, bridge dimensions are to be considered approximate, while general bridge form and type are considered to be relatively static.

The elevation of the bridge deck on the Minnesota side of the river would be approximately 113 feet above the river surface sloping up to approximately 159 above the river surface on the Wisconsin side of the river. The 16-20 foot deep and 98 foot wide bridge deck would be supported by a regularly spaced series of columns and towers approximately every 480 feet with suspension cables attached between the towers and deck. Cable stays and anchors on the deck would increase the width of the structure by an additional 20 feet and railings and safety barriers would increase the height of the bridge deck by approximately 27" to 48." Total width including deck and columns would be approximately 130-134 feet wide as a result of the tapered nature of the columns. Cantilevered pedestrian viewing platforms would extend the width of the bridge beyond the outside of columns an unspecified additional width. The cable stays of the extradosed type reduces the number of piers required for support.

The cylindrical, fluted columns and towers as well as the deck would be constructed with reinforced concrete. As proposed, the towers would be 170 feet on the Minnesota side of the river, increasing each segment on slope to 220 feet high on the Wisconsin side of the river. This would mean the height of the final tower in Wisconsin would be equivalent to a 22 story building.

The design concept chosen by the Stakeholders Group is "Organic." Relative to other bridge types, this bridge design is considered to be "light on the landscape". However, relative to existing conditions, the overall form of the proposed bridge is massive and heavy in terms of overall size, scale and appearance.

In the Mn/DOT/WisDOT publication, the *St. Croix River Crossing Project – Visual Quality Manual*, the bridge form is described in these terms:

"Each pier location is a collection of three legs or columns below the deck and two towers above, with a cross beam tying the three columns together below the deck. The towers above the deck each support a plane of cables that attach to the edge of the deck in a semi-fan arrangement. Cables are anchored at the deck and saddle mounted at the towers. The deck is formed from two equal parallel box-

segments, linked at deck level. Floor beams tie the deck boxes together at each cable anchorage.” (VQM page 5-10)

As revised based on the “St. Croix River Crossing Preliminary Engineering Concept Refinement Report” (Parsons Brinckerhoff, 2009):

“The VQM concept three-column pier with a center column under the box girder girders was revised to a two-column pier by eliminating the center column. Structural analysis determined that the center column was not necessary, and with post-tensioning the cross girder between the two columns had sufficient strength to support the box girders. From a visual quality aspect, the removal of the center column had been the desire of the Visual Quality Review Committee during the development of the VQM, but structural feasibility needed to be confirmed before this goal could be attained. In addition the form of the pier columns was refined to improve constructability.” (Concept Refinement Report, Executive Summary page 1-2)

The massive bridge structure would connect to massive concrete bridge abutments and wing walls at perpendicular angles to the river in an existing ravine near the top of the bluff on the Wisconsin side and top of the hill on the Minnesota side. Though visual simulations show trees growing beneath the bridge deck, the steep slope of the Wisconsin bluff under the bridge would likely need to be stabilized with crushed stone rip rap. This is recognized in the VQM:

“...areas of slope immediately below the east end of the new river crossing bridge may need to be stabilized with rock due to the impeded vegetation growth caused by the bridge’s rain shadow.” (VQM page 4-3)

2. Visual Assessment

Linear elements associated with the proposed bridge include strong horizontal and vertical lines associated with the massive bridge deck, columns and towers. The diagonal semi-fan shaped cables radiating out from the towers also create bold straight lines, although at a smaller scale than the deck, columns and towers. While the underside of the deck boxes would be curved, and the columns and towers rounded and fluted, between the straight arrangement of these elements and the edges of each of these structures bold lines would be introduced into the viewshed.

Bridge lighting would be mounted on evenly spaced vertical poles and would introduce additional linear elements as part of the bridge design. The treatment on the ground beneath the bridge where vegetation is removed following the straight drip line of the bridge deck will create a wide, bold line that will appear either diagonal or vertical depending on the angle of observation.

Based on written descriptions and VQM visual simulations, bold new colors would be introduced into the environment if the proposed bridge is constructed.

“The organic visual treatment will be complemented by colors and finishes that

are authentic, direct, and natural expressions of the materials used: smooth, metal-formed concrete; either genuine stone or formed concrete, as appropriate depending on location and budget considerations; and for railing and other metal elements, mill-finish stainless steel or galvanized steel. Where synthetic materials are required, as with vinyl cable covers, the colors will compliment the natural materials' colors. Long term maintenance must be considered in the selection of all materials, surface treatments, finishes and colors."

In essence, material colors will not be changed or altered except to blend with other bridge material colors. Concrete will be an off-white to buff grey, cables, railings, light poles and other metal elements will be a metallic silver/grey color. If stone is used on the abutments and wing walls, or in rip rap, these materials would introduce additional colors. If crushed stone rip rap is not used beneath the bridge, exposed soil would create a large patch of solid color on the ground surface. These colors would represent colors that are not dominant, are not concentrated at the proposed size and scale or are generally not present in the surrounding landscape. These colors would not only be apparent during the daylight hours, but also during at night with both overhead lighting elements and architectural accent lighting to illuminate the bridge for increased viewing opportunities. The accent lighting would also introduce additional colors into the viewshed as multicolor, changing lights are proposed.

The overall texture of the proposed bridge would be characterized as smooth with regular segmented punctuations created by the columns and towers on the larger scale and at a lesser scale with cable anchors against the smooth surface of the deck sides.

3. Contrast Rating of the Proposed Bridge

The proposed bridge was evaluated from three separate observation points to assess the potential visual contrast of this new element, if constructed, against the surrounding environment. The three observation points were selected to represent typical views that visitors and residents would most frequently experience the bridge and to provide multiple angles of observation. The specific observation points were from the elevated position of the St. Croix Overlook looking down, a riverbank view from the former Terra Terminal warehouse site looking at the proposed site at a more level view, and from approximately the center of the river at water surface level looking upstream immediately downstream from the proposed crossing providing an angle below the bridge looking up. Visual simulations prepared as part of the St. Croix River Crossing Project Visual Quality Manual were used to assist with the contrast ratings and provided views either directly from these observation points or very close to the same location.

Compared with the existing structures in the landscape, the bridge would introduce a new form that in size, shape and scale would dominate the landscape and would be in direct contrast to all other structures within the viewshed. Even when contrasted to the coal-fired power plant with its large buildings and tall smokestack, the proposed bridge would dwarf these structures due to its massive nature. Because of the enclosed characteristic of this landscape type with its strong axial view up and down stream created by the valley walls and bluffs, the new bridge, crossing the river would completely disrupt and alter the expansive nature of the landforms and would block views up and down river. The massive scale of this bridge would make it visible for many miles

up and down river. The addition of movement with passenger vehicles and large trucks across the top of the bridge would also draw the viewer's attention towards this new form.

Where the bridge contacts the bluff line edge, changes in the landform due to cut and fill and the construction of a bridge abutment and wing wall would disrupt the relatively smooth, undulating landform. It would also break the continuous forest canopy that exists on the Wisconsin side of the river and introduce grassy banks in the immediate road cut. The width of disturbance during construction would likely be considerably wider than the bridge width itself. While trees are proposed to be planted following construction activities, "the size of which to be determined by budgetary considerations," the newly planted trees will inevitably be substantially smaller than the trees that make up the existing forest canopy. Thus, a disjointed vegetative form would be created by introducing a new age class of trees and altering the forest density. These same changes to the landform and vegetation would also occur on the Minnesota side of the river. Minnesota impacts would likely not create as dramatic a contrast due to the lower slope, the distance from the river and the previously disturbed nature of the landform and vegetative cover. The smooth reflective surface of the water would also be disrupted with the addition of this new bridge form. Not only would the piers create small eddies in the water surface as is similarly demonstrated by the Interstate 94 highway bridge 4.5 miles downstream, but the new bridge would break the reflective quality of the water that currently mirrors the sky across the broad expanse of this portion of the river. The reflective quality would not only create a new double line by reflecting the horizontal deck, but will accentuate the vertical lines by making them appear double in length. The color of the bridge elements will also be reflected, as will the shadow created on the underside of the bridge deck creating a dramatic contrast.

Due to the scale and orientation of this proposed bridge, stark, straight lines of a new color would be introduced into the landscape. These new lines do not match the more subtle lines created by the natural landscape and do not match the scale or orientation of lines created by cultural elements in the landscape. The evenly spaced columns, towers and bridge lighting poles would create repetitive linear elements not found in the surrounding landscape and create a strong contrast. Because the towers would be considerably higher than the deck of the bridge, even when viewing the bridge from the surrounding hilltops, the towers would punctuate the horizon creating new, repetitive vertical lines into the skyline. While the deck is roughly horizontal, being on a slope, it is not parallel with the water surface which would create a disharmonious line.

Additionally, because the deck is elevated so high above the water surface, this line would be more noticeable, especially when viewing the bridge from a direct angle or from below as it would be silhouetted against the sky. The cut in the vegetation and associated earthwork would add a new, broad line with a butt edge contrasting the existing forest cover. The new exposed gap, depending on the viewing angle, would be diagonal to nearly vertical against the hillsides. The color of the exposed concrete of the new bridge would be off-white to light grey. Compared to the darker, more complex colors in the surrounding environment these new colors would create a dramatic contrast. Because of the relative lightness in value, the bridge color would appear to advance and stand out against the surrounding landscape colors and would dominate the scene. The exposed stainless steel and galvanized steel would also create a light contrasting color that may add an additional metallic reflective quality to the environment unlike the more

glassy reflective quality of the water surface. When the water surface reflects the colors of the sky, the bridge would create a darker streak due to the shadow effects under the bridge that would add an additional bold contrasting color in the reflection. At night, the use of metal halide lights to illuminate the deck surface, trail lighting, bridge accent lighting to illuminate the bridge structure itself and standard aviation obstruction lighting to meet FAA regulations will all bring new colors to the night time scene and will create further bold contrasts to the muted night time colors. The accent lighting would also introduce bold and dramatic colors into the viewshed as multicolor, changing lights are proposed. Natural night sky viewing would be impeded through the addition of unnatural light.

The assortment and complex combination of multiple colors in the vegetation would be starkly broken. While new trees would be planted, the relative small scale of these new trees, combined with the fact that they would be surrounded by a grassy hill slope, would interrupt the existing forest color scheme. Due to the overall smaller volume of forest colors, the different hues of leaf color in the newer trees and the grass color would create a strong contrasting color shift in vegetation from what currently exists in the forested canopy. The constructed hill slope and crushed stone rip rap beneath the bridge would further contrast the color scheme of the landform as the hill slope is presently covered with leaves and debris generated by the vegetation over time.

The texture of the bridge with its metal-formed concrete will be extremely smooth when compared to most of the existing textural elements in the landscape. The segmented pattern of the structure would modify the smooth texture somewhat at the larger scale while the cable anchors would create a very regular jagged texture against the smooth deck surface when viewed in closer proximity. The bridge abutments would be veneered with stone or would be poured and formed concrete to simulate a limestone wall. These abutments would contrast the natural smooth surface of the hillside. The continuous forested canopy that is dense and moderately coarse would be broken and new texture changes would be introduced. Smaller trees will change both the color mottling and textural grain. The addition of grass in the exposed hill cuts and interspaces between new trees would be smooth compared to the forested texture. If rip rap is used an additional contrasting texture would be added to the relatively smooth landform.